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PC-BASED INFORMATION SYSTEMS USED IN PLANNING AND COORDINATING THE BUILDING 823 EXCLUSION FROM TECH AREA I

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ABSTRACT

This report describes the application of word processing, graphics and data base software to the tasks necessary for the exclusion of Building 823 from the secure technical area at Sandia National Laboratories. In particular, this report focuses on the development of the building floor plan layouts and the space/personnel data base which were used by management to plan and coordinate the project. Once the project is complete, these information systems will continue to be maintained by other personnel for administrative purposes. The software developed has potential applicability to other facilities where administrative monitoring or space assessment is required.

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INTRODUCTION

In spring 1989, as a part of the Federal initiative for the National Laboratories to interact more effectively with U.S. industry and to improve our international competitiveness, Sandia management made the decision to exclude a research building, Building 823, from classified operations in a secure area. When excluded, the building will be available for use by visiting scientists from industry and academia, both U.S. citizens and non-citizens. Among the many tasks to exclude the facility and yet continue to maintain an operation secure for proprietary information, were the tasks to:

1. Develop a data base for all occupants and their affiliations.

2. Have an active floor plan showing locations of labs, responsible organizations and individuals.

3. Combine the information systems to identify labs and offices available to visiting scientists and to provide a base for badging the visitors.

The information systems were to be implemented on a standard PC in a format that is easy to update and to interrogate for different purposes.

These information systems were used to compile the use of existing space and develop plans for occupation by several Sandia groups involved in technology transfer, as well as occupation by visiting scientists. When the facility is moved into the unclassified area, these information systems will be used to identify lab and office space for use by visiting scientists and provide information for the badging of visitors. These information systems will then be maintained and retained as part of the overall security plan for operation of this facility.

Information systems such as those developed in this report would be useful in space allocation and effective utilization studies for other facilities. Consequently, the procedures and results developed are described in the following document. The document contains the computer programs and procedures for the data base and for the facility floor plans. Examples of their use in terms of the facility usage are given. Suggestions for additional automation are also cited.

BACKGROUND

Once the decision to exclude Building 823 from the secure area was made, a goal of June 1990 was set to complete the task. The project included the relocation of the security fence to the north of the building, construction of a receptionist area and new entrance to Building 823, the relocation of personnel, and the installation of an automatic access control system. This access control system utilizes a special ID badge and a machine in which to insert the badge to read a digitized magnetic strip. This strip would have the necessary information acknowledging that the person indeed has approved access to the Building. This system will be coordinated with the Security Division, 3432, to ensure that appropriate personnel were entered into the data file to run the machine.

The tasks for this project involved working with many different groups at Sandia, including: Facilities Engineering, for the physical layouts and general building construction; Security, for the access mentioned above; Communications, to provide data communications to Building 823; Sandia Livermore concerning the hookup of its super computer, and the department in 6000 itself which deals with data processing and communications. It was due to the interactions with these organizations that it became important to develop the information systems discussed in this report. Management could use them as planning tools to disseminate information and once the project was completed the systems could be used for records maintenance.

Richard Traeger, the Department Manager assigned the responsibility of coordinating this project, had the support of his Management Aide, Christina Tolendino, and the organization's Administrative Assistant, Jack Hanna. The Administrative Assistant aided in acquiring the space allocation information, obtaining floor plans from plant engineering, working on budget costs for 6000, and attending meetings for the Department Manager. The author provided support to the Department Manager through the use of a personal computer with word processing, graphics and data base software to develop ways of automating several tasks.

It was the author's responsibility to get the information into a form that could be easily updated. Initially, the creation of the programs was time consuming due to the need to learn new software packages and to actually input the data. It was important to have this material in a form that could be easily accessed for quick response to management's requests for information.

It was determined that a program would be required to keep track of the continuous movement of personnel in Building 823 and the resident organizations within the building. With this in mind, the floor plans were created using PC graphics software.

This same information on the building would also need to be put into a document so space information could be sorted by topics such as organization or personnel occupying a specific floor. In order to compile this type of information and to have the capability of make different styles of reports, it became obvious that a data base would be most effective.

In compiling the information on the Building 823 exclusion for dissemination to Organization 6000 and other pertinent personnel, both word processing and graphics were needed. This report describes these information systems and the appendices address the detailed editing procedures required for these systems to aid personnel in assuming maintenance responsibility.

HARDWARE AND SOFTWARE UTILIZED

The methods used to support management in its efforts to facilitate the 823 exclusion in a timely, efficient manner are covered in this section.

The tasks to be accomplished with the PC-based information systems were:

1. Dissemination of general information to the personnel in Organization 6000 and support organizations;

2. Creating a working set of floor plans that management could use to locate available space; identify office, lab, building services and other types of space;

3. Drawing up a conceptual design of the new entrance to Building 823;

4. Implementing a data base to maintain information on space and personnel assignments in Building 823.

The Sandia standard word processing package, MASS11, accommodated most of the general information produced; however, an image scanner and graphics package were used to include pictures and graphics where necessary.

To create the floor plans, the scanner was used to provide a scaled layout from a blueprint. The scanned image formed the basis for drawings done with the graphics package.

The data base software was used to compile the space and personnel information. This software had to have the capability of producing various types of reports emphasizing certain subjects in one report and then another subject in a subsequent report.

The following hardware and IBM PC compatible software were used to do the appropriate work for each task:

1. IBM PS/2 Model 60
2. Hewlett Packard Laserjet Series II
3. Hewlett Packard Scanjet
4. Hewlett Packard Scanning Gallery Plus
5. MASS11 Word Processing
6. MASS11 Draw graphics package
7. Lotus Freelance Plus graphics package
8. Ashton-Tate dBase III Plus
9. R&R Relational Report Writer

The equipment available for the project included a computer, printer and scanner. With this equipment, software was selected that would have the most appropriate capabilities for implementing each task.

In order to keep track of milestones throughout the exclusion, Dick Traeger used Harvard Project Manager. This software compiled interactive PERT charts, charts that could monitor parallel tasks, ordering them by date or changing the critical path when entering additional tasks. Facilities Engineering also maintained an ongoing milestone chart for its responsibilities.

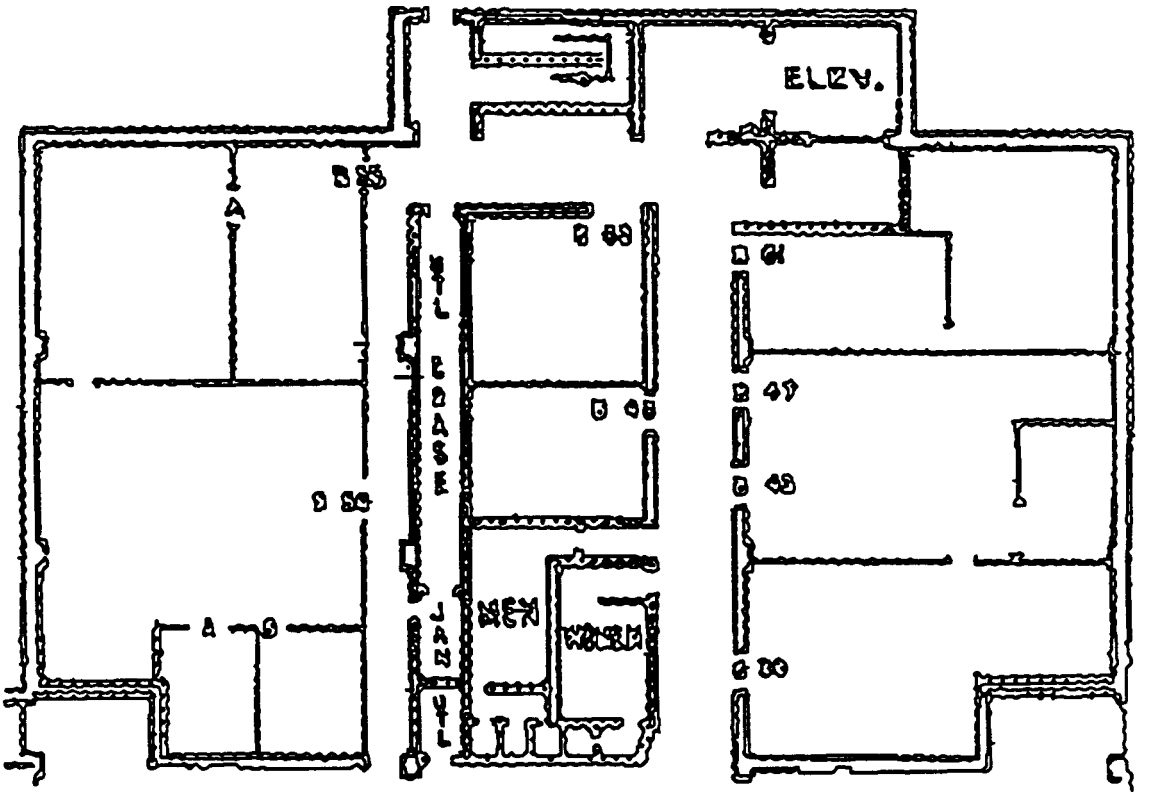
TECHNIQUES USED ON PC

Facility Plan Drawings

Aside from the standard paperwork necessary to initiate the exclusion of Building 823 from the Tech Area, a set of floor plans for the facility was needed for several applications. The available space needed to be monitored as did the personnel and the type of space they used or needed. A set of scaled blueprints was obtained from Jack Hanna, 6200. These blueprints had to be translated into a digital format on the computer to facilitate easy revisions for the many upcoming iterations. Copies were made of the blueprints to place in the HP Scanjet which generated a "TIFF" file with the aid of Hewlett Packard Scanning Gallery software. A TIFF file is a scanned image converted to a Tag Image Format File (TIFF). Initially, the TIFF file was imported into Freelance and a Freelance drawing was created, but the result was a fixed picture that could not be edited; only additions could be made. This limitation made the software unacceptable for this particular task.

MASS11 Draw was then used since it provided the capability of importing the TIFF file into MASS11 Trace and editing the actual outlines of the floor plans. This software also had the advantage of retaining the original scaling of the blueprints. Once the MASS11 Trace file was scaled to a manageable size (one scanned imaged originally filled an entire floppy disk), it was possible to import the file into MASS11 Draw for editing. Extensive editing was required to clean up the outline of the building, as noted in the original picture in Figure 1. The final result is shown in Figure 2. Interior walls were drawn in such a way that they could be easily revised. The exterior walls and certain interior support walls were drawn in permanently. These edited drawing files could be used as is or included in documents as described below.

It was necessary to use a product like MASS11 Draw or Freelance to make drawings that could be easily revised. The word "easily" is used somewhat loosely. It is not difficult to make changes in the graphics packages; however, it is a time-consuming process. To revise one picture takes 30-45 minutes, depending on the number of changes required. Printing is the slow part of the process, taking 10-15 minutes or longer, once again depending on the detail in



Since this draw file was extremely large, only a portion of it was printed here to show the amount of detail in the original .TIFF file. This file was edited by "tracing"over the lines then deleting extraneous material. In this way the file was cut down to a manageable storage and editing size and the scale of the floor plan was also retained for future use.

Figure 1. Partial blow-up of original drawing before editing.

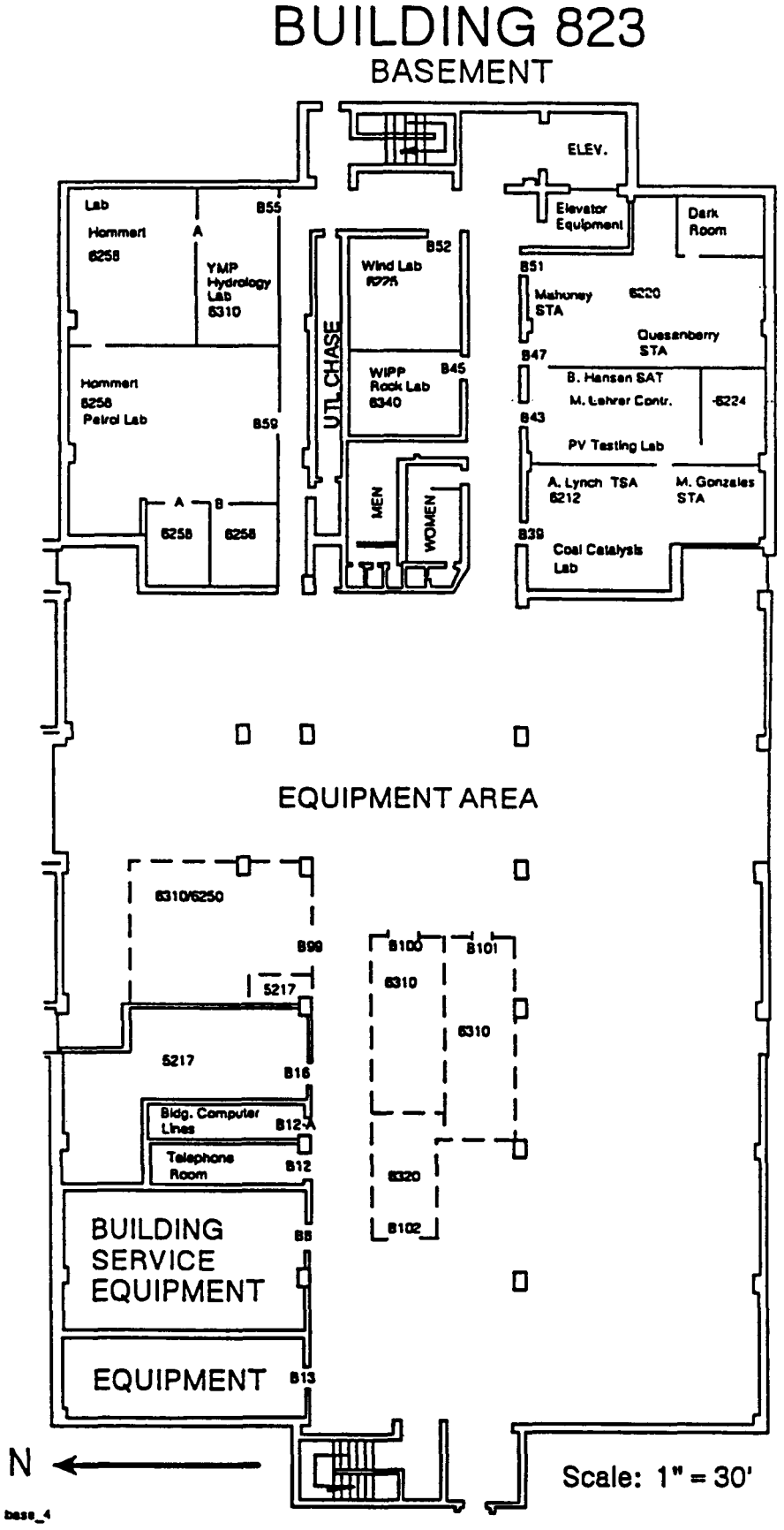


Figure 2. Scaled drawing of 823 basement.

each figure. Obtaining additional memory for the printer improved this problem since it used to take even longer to print a file--20-25 minutes!

Once the above process was completed, the floor plans produced were presented at a meeting which included Dick Lynch, Director of Nuclear Waste Management and Transportation 6300, and Linda McEwen, Assistant to the Vice President, 6000--the line management that Dick Traeger kept apprised of the project. At the meeting it was decided to proceed to the next stage, that of adding the personnel names to the offices. The classification of each person was also added, making it easier to distinguish Sandia employees, contractors, DMTS, etc., for future modifications of personnel and space assignments.

Information Media

In the early planning stages, the decision was made to add a logo to the letterhead of material concerning the Building 823 exclusion project. This would emphasize the building information being distributed to Org. 6000 personnel. The process of developing a logo began by first taking a photo of 823 with the aid of Don Cook, a Staff Technical Assistant in Division 6216. The photo was then scanned on the Hewlett Packard ScanJet and the file imported into Freelance Plus. Within Freelance Plus, the text and box were added, and the logo finalized (Figure 3).

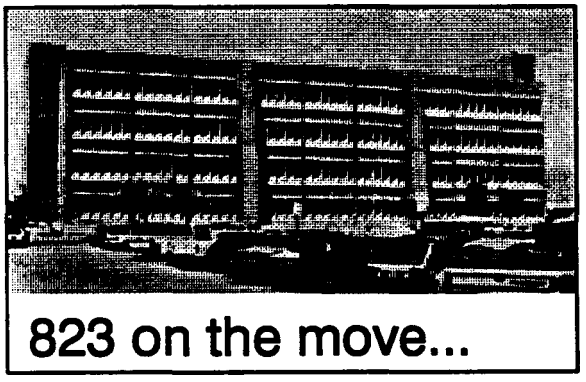


Figure 3. Building 823 logo.

The logo was incorporated into a MASS11 document using a graphics utility provided by Don Schueler, Department Manager of the Solar Energy Department 6220 (this technique was used above to incorporate the logo directly

into this document). This method uses a special program named "graphm11.exe" to process Freelance .DRW files into output files using the laserjet output option. The program removes cursor repositioning and page eject commands as well as other commands so that the resulting "processed" file can be incorporated directly into MASS11 documents using the normal embedded file commands. Files can then be included as part of a document without disturbing the pagination or text positioning.

Both MASS11 Draw and Freelance use what is known as a draw file (.DRW). A .DRW file contains the drawing or chart created along with the drawing commands used. These .DRW files are then used as input to special software utilities that are either contained in the software itself or a special program such as "graphm11.exe." The utilities produce output files suitable for direct inclusion in a document. The following is an example of a command used when a Mass11 file is being imported into a document by using embedded commands within the document:

FILE=x.xxX,x.xxY,x.xxG,"\MASS11\GRAPHICS\xxxx.jet"

The embedded command contains the following information:

1. The x, y coordinates are used to place the figure in the document at a specified location. For example, "1.00X,.25Y" would indicate one inch to the right of the left margin (x), and 1/4 inch above the above the current line of text (y) where the embedded command is typed.

2. The "g" coordinate indicates the amount of vertical space required for the graphic image. For example, enter "3.0g" when the picture requires three inches of space. The text will continue below the space assigned for the picture.

3. The file is located in the "MASS11" directory, "GRAPHICS" subdirectory and the file name is XXXX.JET.

Two additional forms were designed using Freelance Plus. These forms initially aided in accumulating information on organizations moving in and out of Building 823 during the transition (Figures 4a and b). The forms kept track of

Possible Moves Into 823
NOTE: All 6000 moves are space neutral

Date _____

ORG	DM/S	DS/S	MTS/TSA	LAB SQ. FT.	SPECIAL NEEDS, COMMENTS	CONTACT

(a)

Moves Out of 823

Date _____

ORG.	DM/S	DS/S	MTS/TSA	LAB SQ. FT.	SPECIAL NEEDS, COMMENTS

(b)

Figures 4 a and b. Movement forms created on Freelance Plus.

such items as floor space and special needs of the organizations that requested space. Freelance Plus was used for these forms since it was quicker and easier to draw them with this software than to use the draw feature of Mass11. Mass11 was used to place the text on the forms, thus taking advantage of its better word processing capability. Later, a data base was set up to compile similar information and provide more flexible output.

It became evident that a conceptual design was needed for the new entrance that was being developed by Facilities Engineering. Viewgraphs and hard copies of these floor plans were prepared to disseminate information. These drawings were created using Freelance Plus. Once the figure was drawn, revisions were made whenever Facilities Engineering modified its plans (Figure 5). With the use of Freelance and the Laserjet printer, viewgraphs could be made directly off the printer without the loss of detail that often occurs when using Xerox copiers or a thermofax machine.

Data Base

A data base was also required to compile different types of information about the building and its personnel. It was necessary to be able to do queries and sorting in order to provide reports emphasizing different subjects in each report. There were two reasons for setting up this data base:

1. To aid in the exclusion of 823 from the secure Tech Area.

2. To maintain updatable records of personnel and space allocations after the transition. This job will be assumed by the Administrative Assistant to Dick Lynch, 6300 in a short time. The Administrative Assistant will maintain records of available space for uncleared personnel such as visiting professors, uncleared Sandia employees and contractors.

In order to create a data base, a list of required information was compiled. The data field entries were set up to satisfy these needs. The fields and some of the allowable entries into dBase III Plus were:

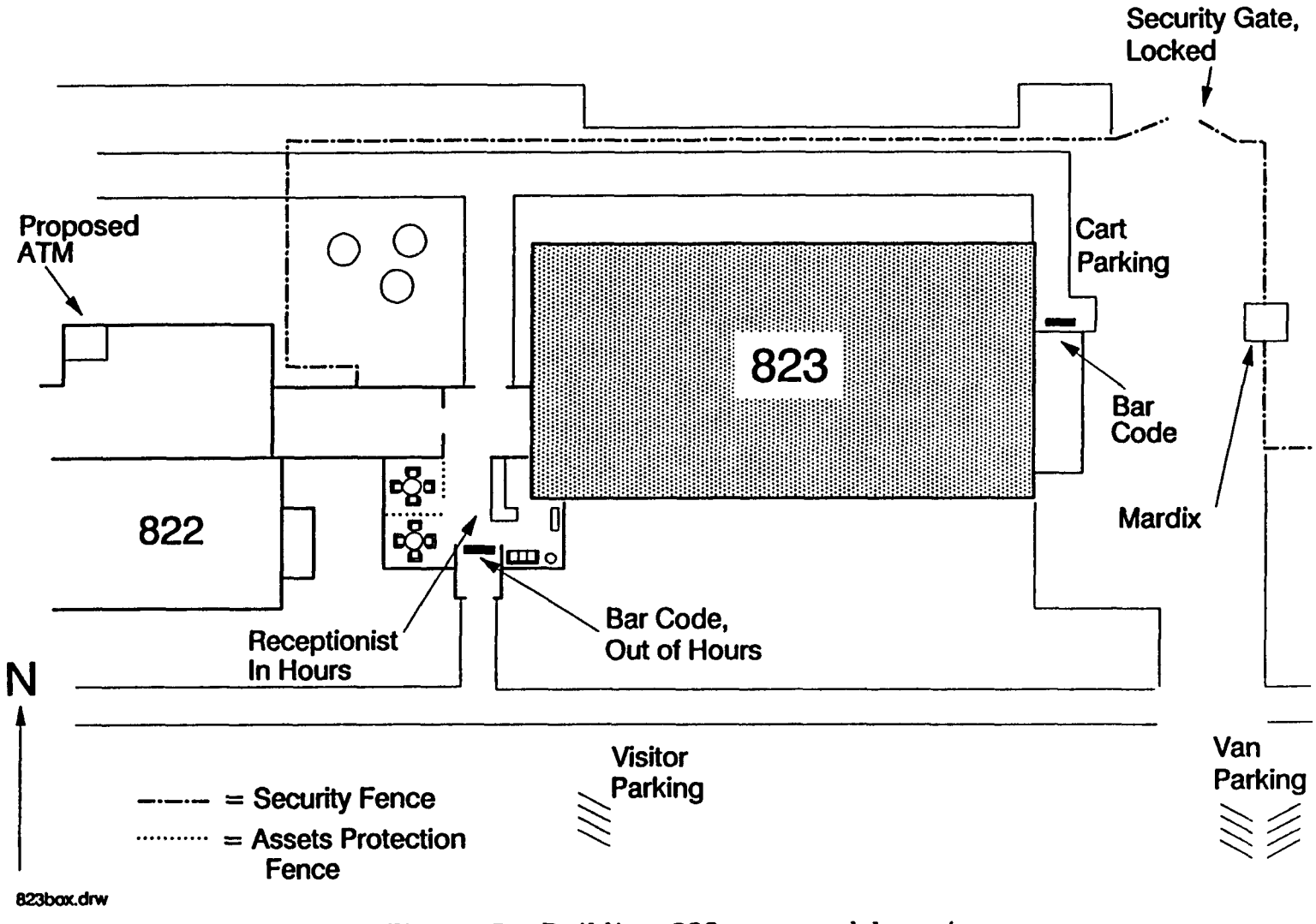


Figure 5. Building 823 proposed layout.

Room Number
Organization
Area (in square feet)
Type (of space allocated)

Office	Geochemistry Lab	Document Room
Library	"Other" Lab	Resource Room
Chemical Lab	Conference Room	
Electronic Lab	Bldg. Services	
Computer Lab	Storage	

Name (of person) - Last name and initials
Classification

SUPVR	DMTS	SAT	CAT	VP
DIVSEC	MTS	TSA	PERSREP	EXECSEC
DM		MAII	GR	TCHWTR
DIR	TA	MLS	STAFSEC	

Phone
Affiliation
Sandia
Contractor
Industry
Academic
Status

Permanent	TDY
Summer Hire	ONLOAN

Needs
Smoking
Handicap
Classified
Other
Cleared - Yes/No
Space Available - Yes/No
Responsible Organization (in case a room belongs to an organization other than the one using the room)
Extra fields
Note - explanatory comments

Once the information was entered into dBase III Plus, support software called R&R Relational Report Writer was used to create reports faster and more easily than was possible with dBase III alone. R&R Relational Report Writer was used to index, sort and query without altering the actual dBase III file.

R&R has the flexibility of using commands similar to those in dBase III Plus to facilitate easy transition from one software package to the other. However, R&R also has a feature permitting the set-up and formatting of a report on the screen and then producing a hard copy that looks exactly like the material on the screen--WYSIWYG (what you see is what you get). This can be accomplished in one of two ways, either by entering the information manually, first typing in headings and footings, then entering the desired fields, or by using the menu-driven option. There are pull-down menus to add fields, titles, do queries and sorting, plus other capabilities such as keeping tallies, special time and date fields, and incorporating multiple data base files.

With the information stored in this data base, statistics could be compiled and published on square footage in an organization, available office space, the amount of space allocated to labs and offices, or the need for classified space within the secure area. Information could be extracted, for example, on who is located on the fourth floor or where all 6300 personnel are located. An example is shown in Figure 6.

11/09/89

Building 823 Exclusion
Basement

Org.	Rm. No.	Name	Sq. Ft.	Space Available	Type of Space
5217	B016		810	F	LAB
6212	B039	LYNCH, A. W.	830	F	LAB
	B039	GONZALES, M.		F	LAB
6220	B051		320	F	LAB
6224	B043	LEHRER, W. M.		F	LAB
	B043	HANSEN, B. R.	670	F	OFFICE
	B047	QUESENBERRY, P. E.	825	F	LAB
	B047	MAHONEY, A. R.		F	LAB
6225	B052		400	F	WIND LAB
6258	B055A		605	F	LAB
	B059		1135	F	PETROLOGY LAB
	B059A		165	F	LAB
	B059B		175	F	LAB
6300	B016A		780	F	STORAGE
	B055		410	F	NHWSI LAB
6310	B100		405	F	STORAGE
	B101		420	F	STORAGE
	B102		260	F	LAB
7800	B008			F	BUILDING SERVICES
	B012		200	F	BUILDING SERVICES
	B012A		200	F	BUILDING SERVICES
	B013		590	F	BUILDING SERVICES

Figure 6. One type of report created with dBase III Plus and R&R Report Writer.

CONCLUSION

There were other tasks involved in the 823 transition, however, they were conducted at the management level. The tasks discussed in this report were completed by Christina Tolendino, Management Aide, Org. 6250; in support of Richard K. Traeger, Manager of GeoEnergy Technology Department 6250.

It would have been impossible to meet the Department Manager's needs without a personal computer and the software tools to produce the quality and quantity of material required in a timely manner. It was important to be able to obtain the information then convert it to a format convenient for the various applications necessary and also to have a product that would be usable after the transition. The information had to be clear, concise and completed quickly to support the Department Manager's deadlines. The information also needed the capability of being readily revised for the numerous meetings that occurred.

The data base and the floor plans were set up with the intention that the responsibility for maintaining records of personnel and space in the building would eventually be assumed by another person. Therefore, it was important to select a software common to PC users to enable that person to become familiarized in a short period of time. This was also important in selecting the graphics package, MASS11 Draw. However, acquiring a software package with the right graphics capabilities was equally important. One of the advantages of using MASS11 Draw, though, is that it is compatible with its sister, MASS11 word processing software--Sandia's standardized word processing software which allowed the layouts to be included in various documents.

Since creating these information systems, copies have been requested by other organizations at Sandia as examples to set up similar programs.

APPENDICES

It should be noted that the following appendices assume that all software has been loaded onto the user's computer. Preferably, the user should have prior knowledge of the software packages. If not, each software comes with a manual containing installation instructions for the appropriate computer and operational instructions.

APPENDIX A

USING A SCANNER TO CREATE A TIF FILE

APPENDIX A

Using a Scanner to Create a TIF file

For this procedure it is necessary to have a scanner and the appropriate software. A Hewlett Packard ScanJet Plus and Scanning Gallery Plus software were used for this project. Scanning Gallery, or Scangal, is a MicroSoft windows-type environment.

To scan a document (i.e., photo, floor plan, etc.), place the document into the scanner face down. On the computer, complete the following procedure:

Enter Scangal; note Scangal is mouse-oriented. Two menus appear and first the user will work in the right-hand menu. Use the mouse to select **Scan** in the upper row and drag the cursor down, pressing the left-hand button. Release the button when **Preview Scan** has been highlighted. An hourglass appears which signifies "wait." Another menu appears asking about print options. Unless the user is familiar with Scangal it would probably be best to accept the default setup. Select **OK** with the left-hand button of the mouse. An hourglass appears again and the scanner commences scanning. Prompts come on screen at times and one now states:

To scan only a portion of your image, press your mouse button and drag the cursor to select an area. Then use Image Scan.

Select **OK** with the left-hand button of the mouse. A small copy of the document appears and follow the above instruction. (Don't be too concerned that this small picture isn't clear. It's not the final copy.) Note: If the whole page is scanned at this point <u>all</u> pixels on the page are recorded-even those which are considered "blank" space. So it is important to frame only the necessary information. To do otherwise makes an impossibly large file, not easily stored, printed or moved.

Frame the object then use the left-hand button on the mouse to select **Scan** and drag the cursor down, highlighting **Image Scan**. Release the button at this point and an hourglass appears. The image is now being scanned. During this process the document should not be removed from the scanner or scanning will be incomplete. The next menu

(on the left-hand side of the screen) allows the user to lighten or darken the scanned image, adjust size and change gray shades. Make desired selections with the mouse. Then with the left-hand mouse button, select **Scan.**

At this point another menu appears and requests a title for the new file. Type in the name and ".tif" will automatically be entered. Once this is completed an hourglass appears while the scanning is completed. When the menu reappears, select **File,** then select **Exit.** The small right-hand menu disappears leaving the main screen on. Note at the top of the screen is the name of the image file just created.

To see the complete image, with the left-hand button of the mouse select **View** dragging down to highlight **Full View,** then release the button. An hourglass appears. When the image appears more cropping can be done by framing the desired material--dragging the cursor from the upper left corner of the drawing to the lower right corner, then releasing the button. Select **Edit** and drag the cursor down to **Crop.** If more cropping is desired, repeat the process.

To print the image, select **File** and use the mouse to drag the cursor down to highlight **Print.** An hourglass appears. In this case, down't change anything in the print defaults. Once again, the user should be familiar with the software print options before changing anything. Select **OK** with the left-hand button of the mouse. A menu appears and informs you that the image editor is printing:

Printing image - 87% complete.

It may take a while for the printed page to eject from the printer. When this procedure is completed, select **File** once again, then select **Save** by using the mouse to drag the cursor down to highlight it. It is as this point that a file can be saved to a floppy disk if desired. Just type in the drive desired before the title of the file:

A:title.tif

Once the file is saved, select **Exit** with the left-hand button of the mouse and the user will terminate the Scanning Gallery Plus software.

APPENDIX B

USING MASS11 DRAW TO EDIT BUILDING 823 FLOOR PLANS

APPENDIX B

Using Mass11 Draw to Edit Building 823 Floor Plans

Mass11 Draw was used to create the drawings shown on pages 8 and 9 of the main report. To update these drawings involves the use of a mouse.

For the purposes of this Appendix a two-button mouse was used. However, there is no problem using a three-button mouse. Just set it up according to the instructions packaged with it.

The appendix will explain the steps necessary to edit one of the floor plans. However, the user should have a working knowledge of the software to attempt to create a complete set of drawings. See the manuals supplied with the software for complete instructions.

Once Mass11 Draw has been accessed, point to **File** in the upper menu and click the left-hand button of the mouse to select it. In the second menu, select **Read** in the same fashion, then type in the name of the desired file. Or, once **Read** has been selected, press **ENTER** for a complete list of files in the Mass11 Draw directory. Use the cursor on the keyboard to highlight a file and press **F2** to select. For this particular step, besides the F2 key, the ENTER key also works.

Selecting an object to edit can be done in one of two ways:

1. Selecting a single object - With the mouse, point by pressing the left-hand button and "dragging" the cursor across the object. Release the button and the object should be highlighted in orange.

2. Selecting several objects - On the left-hand menu (appearing on the screen at all times) select the three arrows (\\\) by clicking the left-hand button of the mouse. Return to the floor plan and point at or drag across the desired objects. The objects should be highlighted in orange.

Once an object is highlighted, it can then be edited (i.e., duplicated, deleted, enlarged, reduced. The style can also be edited.)

To de-select an object, either use the mouse to drag the cursor across it and click, or point the cursor at the three arrows on the left-hand menu and click the left-hand button. This might have to be done twice until the object is no longer highlighted in orange.

Other features of Mass11 Draw worth mentioning here are:

1. The capability of enlarging (2XZoom) or reducing (Zoom/2) the drawing.

2. Relocating anywhere in the drawing by using the mouse to point to a box in a square in the upper left-hand corner of the screen. Just move the box around and you move around in the drawing on the main screen.

3. If you make a mistake, before continuing on, point to **Undo** in the upper menu and click while the mistake is highlighted. The previous version will reappear--but only the last one. This feature is good for one iteration not the whole editing session!

To enter new text, use the mouse to point to the left menu and click the left-hand button on **Text**. (If the arrows are still highlighted, you will hear a beep--point at them with the mouse and click again to de-select.) A pencil now appears on the main screen instead of an arrow. With the mouse point to where you want the text and click. The pencil now has a "T" superimposed on it signifying the user is ready to type in data. When done, press ENTER and the word is highlighted in orange.

If the characters are not the correct size or style do the following:

Select **Edit** in the upper menu with the mouse. On the next menu, select **Font**, then select **Face**. On this menu the author selected the **Modern** style. Once this is done the software backs out one menu and size should be selected, if desired, at this point. This floor plan is done in **6pt** (point) size.

If selecting size for the first time, go through the same steps as above; selecting **Edit, Font, 6pt.**

Walls can be moved or deleted the same way. Use the mouse to point to a wall and click the left-hand button to select. Note: take care to point exactly at the wall, better yet, drag the mouse across the wall to select it. A problem encountered with Mass11 Draw is that an outer wall will sometimes be selected and edited without your knowledge when you just "point and click" to select an object--if you've "zoomed" (2XZoom) into the picture.

To move an object, highlight it and while "touching" the object with the arrow press the right-hand button. A hand appears in place of the arrow. Move the mouse to the new position and release the button.

To delete multiple objects or delete a group of objects, highlight several objects by selecting the three arrows on the left-hand menu. After highlighting objects, point to **Delete** in the upper menu and click the left-hand button on the mouse.

Sometimes multiple or group duplication comes in handy instead of retyping. For instance, Sandia's ranking system changed and instead of going back and retyping "SMTS" for "MTS," it was easier to a mass delete then type "SMTS" once and duplicate it. Point to **Duplicate** in the upper menu and click the left-hand button on the mouse. A second "SMTS" appears highlighted in orange. Move this to the desired position and while it is still highlighted select **Duplicate** again. Continue until finished.

To add a wall (line), highlight the ⊢ on the left-hand menu with the cursor. A pencil cursor appears. On the drawing, by using the mouse, position the cursor where desired and press the left-hand button on the mouse. Drag until the desired length is reached. Release the button when finished. Remember this is a good time to use the **Undo** if necessary. This option produces nice straight lines. For the exterior of the building, the ⩓ (polyline) was selected.

When editing is complete, point to **File** in the upper menu and click the left-hand button. If the current name of the file is what you want, point to **Save** and click the left-hand button on the mouse. If a new version of the drawing is desired (plus maintaining the old version) it is at this point that the file would be renamed. Point the cursor to **SaveAs** and type in the new name. **SaveAs** can also be used to file off onto a flippy disk. Example:

SaveAs A:1STFLOOR (This is the new title, A: designates the desired disk drive.)

Once the file has been saved (this should also be done several times during editing so material is not accidentally lost), printing can be done.

Select **Print** in the upper menu. Cursor down to section entitled **Specify Portion Of Original Image to be Included** and type in the dimensions of the drawing:

Inches DOWN from trimmed top of original 10
Inches ACROSS from trimmed left of original 6.5

When done, press **F2** to start printing process--which can take almost ten minutes!

When all work is completed--and saved, select **Exit** in the upper menu and click with the left-hand button of the mouse to terminate the software.

APPENDIX C

USING DBASE III PLUS TO INPUT INFORMATION INTO A DATA BASE

APPENDIX C

Using dBase III Plus to Input Information into a Data Base

Creating a Data Base in dBase III Plus

Before creating the data base several things must be considered:

1. The selection of fields. In dBase III Plus, information is stored in areas designated as fields. Before creating a data base, a list of topics (fields) should be set up.

2. Once the fields have been created in the data base, they are combined into a "record" or page(s). See the example below. Once the fields are defined, the data

ROOM_NO	*1078*	
ORG	*6250*	(Note: The author's entries to the record have been entered in italics as an example. Also, the amount of space allowed for each entry is designated by the author when setting up the data base.)
AREA_SQ_FT	*240.00*	
TYPE	*OFFICE*	
NAME	*TOLENDINO, C. D.*	
CLASSIF	*MAII*	
PHONE	*6-0142*	
AFFILIATN	*SANDIA*	
STATUS	*PERM*	
NEEDS	*NONE*	
CLEARED	*Y*	
SPAC_AVAIL	*N*	
RESP_ORG		
EXTRA1		
EXTRA2		
EXTRA3		
NOTE		
EDIT SPACE	REC: 2/598	(This is a format line in dBase III that indicates you are in "edit mode, in a document entitled "Space," on page 2 of 598 pages.)

Figure C-1. Sample Record from the Building 823 Space/Personnel Data Base.

can begin to be entered. In the case of this report, the information to be input into the fields was preset, there were no random entries. (See page 15 of the main report for the list.)

3. Style in which information is entered. It is at the discretion of the user whether to use all upper case or lower case letters or initial caps, but be consistent whatever you do. When editing the data base, the information will have to be called up exactly as it was input or dBase III won't recognize it. Once again, refer to Figure C-1.

The "CLEARED" and "SPAC_AVAIL" fields have been set up as yes/no fields, that is, a "Y" or "N" need only be entered. Several extra fields were added in case additional information needed to be added at a later date. The "NOTE" field was set up as a memo type field in case text needed to be included for any reason. Note, also, that a space is not recognized when originally setting up a field, so an underline is used instead.

Other than the information presented above, the creation of a data base can be accomplished by following the manual that is furnished with the software.

Editing the Data Base

Listed below is an example of editing one record within the data base.

* NOTE: Before doing any editing the user should be aware that a record should not be deleted. If this occurs, permanent information input to that particular record will be lost, i.e., square footage and office type for that particular room. Also, space availability is noted for each slot in an office. For these same reasons a room number cannot be switched to another record. There is information specific to each record. As a result, two records need to be edited when moving a person from one room to another within the building. *

Enter dBase
Select the **Setup** menu, press the ENTER key.
Select **Database file**, by using the cursor to highlight it and press ENTER.
Enter the appropriate drive letter (normally software is stored on the C drive) C Drive, press ENTER.
Highlight the data base file name, press ENTER.
Is file indexed? Y/N, type N (no).

If using R&R Relational Report Writer to produce reports, indexing is not necessary since this program takes care of it automatically.

The above sequence will get the user into dBase III Plus and editing can proceed. The easiest way to find a record once into the file is:

Use the cursor to highlight **Position.**
Select **Locate**, press ENTER.

At this point, a small menu appears,

Select **Build a search condition**, press ENTER.

Two more menus appear. The one in the center of the screen is for information purposes and describes the fields listed in the left hand menu. Normally at this point the user would select either **ROOM_NO** or **NAME**, ENTER. It should be noted here that

when there are two people with the same last name the user will either have to enter the last name and initials or do the following:

Select **NAME**, press ENTER

On the next menu

Select = **equal to**, press ENTER

The next menu prompts **Enter a character string (without quotes)** JONES (JONES is the name the user is selecting), press ENTER

The user is then prompted to select **No more conditions, Combine with .AND**, or **Combine with .OR.** Select one, in this case **No more conditions**, and press ENTER. Then select **Execute the Command** and press ENTER. (If there are two people with the last name of Jones and you don't know first names but do know the room number, select **Combine with .AND** and repeat the steps made in selecting the name.)

dBase III Plus then does a search of the material requested and notes that it has "located Rec '131'". At this point, use the cursor to highlight **Edit** in the Update column and dBase takes the editor to the record requested. It is at this point that information may be added or deleted. It is recommended that the user do a print screen if this same information is being assigned to another room in Bldg. 823. It will save looking up the information all over again to re-enter.

Upon completion of inputting information press ^**END** (the Ctrl and End keys) to save or exit. The above iteration may be performed as many times as necessary to enter all changes.

To exit dBase III Plus, press **ESC** to return to the "." prompt, type "quit" and press ENTER.

Once all information has been input, refer to Appendix D on R&R Relational Report Writer for printing out reports pertaining to the data base.

Adding a New Record to the Data Base

Periodically a new record may need to be added to the data base. This is fairly similar to editing but does not involve doing a search.

Enter dBase
Select the **Setup** menu, press the ENTER key.
Select **Database file**, by using the cursor to highlight it and press ENTER.
Enter the appropriate drive letter (normally software is stored on the C drive) C Drive, press ENTER.
Select the data base file name and press ENTER.
Is file indexed? Y/N, type N (no).

The above sequence will once again get the user into dBase III Plus and a new file can be input.

Use the cursor to highlight **Update**, press ENTER.
Select **Append**, press ENTER.

At this point, a copy of a blank record appears and the user can input the new information.

Upon completion of inputting information press ^END (the Crtl and End keys) to save or exit. The above iteration may be performed as many times as necessary to enter all new records.

To exit dBase III Plus, press ESC to return to the "." prompt, type "quit" and press ENTER.

Once all information has been input, refer to Appendix D on R&R Relational Report Writer for printing out reports pertaining to the data base.

Deleting a Record from the Data Base

Deleting a record would proceed like editing:

Enter dBase
Select the **Setup** menu, press the ENTER key.
Select **Database file**, by using the cursor to highlight it and press ENTER.
Enter the appropriate drive letter (normally software is stored on the C drive) C Drive, press ENTER.
Is file indexed? Y/N, type N (no).
Select the database file name and press ENTER.

Select a record for deletion by:

Use the cursor to highlight **Position.**
Select **Locate**, press ENTER.

At this point, a small menu appears,

Select **Build a search condition**, press ENTER.

Two more menus appear. The one in the center of the screen is for information purposes and describes the fields listed in the left hand menu. At this point the user would select either **ROOM_NO** or **NAME**, press ENTER.

Select **NAME**, press ENTER

On the next menu

Select = **equal to**, press ENTER

The next menu prompts **Enter a character string (without quotes)** JONES(JONES is the name the user is selecting), press ENTER.

The user is then prompted to select **No more conditions, Combine with .AND,** or **Combine with .OR.** Select **No more conditions** and press ENTER. Then select **Execute the Command** and press ENTER.

dBase III Plus then does a search of the material requested and notes that it has "located Rec '131'". At this point, use the cursor to highlight **Edit** in the Update column and dBase takes the editor to the record requested.

To delete or "pack" a record as it is called in dBase III Plus, press ^U (the Ctrl and U keys) while in the specific record. "Del" appears on the status line and will remain there until the records have been packed. Then press ^END (the Ctrl and End keys) to save the records at this stage. At the main menu, use the cursor to go to the Update column and highlight **Pack.** Press ENTER. This process deletes the record.

To exit dBase III Plus, press **ESC** to return to the "." prompt, type "quit" and press ENTER.

Appendix D

USING R&R RELATIONAL REPORT WRITER TO CREATE REPORTS FROM THE DATA BASE

Appendix D

Using R&R Relational Report Writer to Create Reports from the Data Base

Creating data base reports was easier with R&R Relational Report Writer for a person not familiar with dBase III Plus. It is set up to operate like a Lotus-type software, i.e., press a forward slash and the menu appears at the top of the screen. One of the nicer features of this software is the ability to set up the desired report on the screen and see the actual format that will print out. The document does not have to be printed first to see what the resulting layout looks like. This software is good because a beginner can learn it fairly easily and it also has features for more advanced users.

As with the other software, be sure to consult the manual that accompanies the program. Below is a quick run through for creating a report and then the process for revising a data base report.

When creating a report in R&R do the following:

Enter the program, then

Select **Create**

Enter the library name, **1stfloor**

A library is equivalent to a directory and any report files created will be placed in this library.

In the top center of the screen is the statement:

Current report library: 1STFLOOR.RP1

To create a report, select **Create** once again. The screen that appears asks the user to select the target data base for this report. This is an important step since this is

how R&R ties the data base to the report-making process. Use the cursor to space over and highlight the appropriate target data base. Once the data base is selected, the program automatically puts the user into the body of the report to begin setting up its format.

Note: If the user makes an error it can usually be deleted by pressing the **Esc** key before the command has been executed. If the information is already permanent in the document, highlight it by cursoring over to it, then select **Report**, then **Erase**.

The different commands in the menu at the top of the screen can be accessed by typing a forward slash (/) then cursoring over to the command, or by typing the first letter of the command word.

The side bar on the left indicates what kind of line is being inserted into the report for example:

1. Header - the date, title of report and headings may be entered here.

2. Body - the fields supplied from the data base are entered here.

3. Footer - page number and extra spaces between the text and page number are entered here.

The software is menu driven and is should be noted that during the session a pop-up menu will appear frequently to assist the user.

Complete the following sequence:

/Line, Create, Body

Use the cursor to position the line where desired, then press ENTER.

This will add "Body" lines to the report in order to begin entering the report format. You may select other types of lines at this point, too, as mentioned above. Once a line has been added, additional lines can be inserted by selecting

/Line Insert

This places the same type of line as the one just previously created (i.e., title, body, header, footer or summary).

To delete a line, first highlight the line by cursoring to it then:

/Line, Delete

To enter fields, press:

/Field, Insert

A small box appears to the right side of the screen. Select one of the field entries by highlighting it then press ENTER. This box shows fields in the designated target data base.

Once the fields have been entered, the appearance can be edited (read the manual for all the options) in various ways a few of which are listed here: column width, centering the columns, font selection, underscoring or making the text bold, and setting up a calculating field (one that does computations).

To type titles cursor to a "Body" line and enter the desired text. Once again a title can be assigned attributes by:

/Field, Attribute, highlight the desired selection.

To move the title, highlight it with the cursor and select

/Move

Cursor over to desired position and press ENTER.

Setting the margins for the report is done in the Print Options under Page-Margins. Select:

/Print, Options, Page-Margins

First, highlight **Printer indent,** press ENTER. Select **1(Columns)** and press ENTER. Type in desired margin **10** and ENTER. This indents ten spaces from the left edge of the paper. Next type **R,** for **Right margin** and press ENTER and select **1(Columns)** and ENTER again. Type the desired margin, **60,** and press ENTER. At this point, the changes to the page margins appear on the picture of the page on the left-hand side of the screen. Select **Quit** to return to the main menu.

The top and bottom margins are handled the same way, in **/Print Options, Page-Margins.** Cursor down to the top (or bottom) margin and press ENTER. The program prompts **select option,** so press ENTER. The choices are: **1(Inches), 2(Lines),** and **3(Centimeters).** Select one, in this case 1(Inch) and press ENTER. Enter the desired width and press ENTER. Next, press ESC to return to the Options menu and then press Quit.

Once the bottom margin is set, any information requiring additional space will automatically be placed on the next page.

To include a date is easy, but involved, and should probably be done by following the instructions detailed on page 59 of the R&R manual.

To paginate the document will required at least two lines, one line for the page number and at least one line to separate the text from the page number (the user's preference). Select:

/Line, Create, Footer (or Header)

Next select **Page.** To add another line use a shortcut. While on the line just created above and having just finished the above commands, highlight **Insert** and another line appears on the screen.

Creating a page field which is a calculated field is accomplished by selecting

/Field, Create, Calculate. Enter **Page** for the field name and press ENTER. Then press **F10** and selection **Function.** Press ENTER and highlight **Quit.** To place the page number on the second footer line that was created, press **F10,** select **Page** and ENTER. Once again, to place the page number in the desired position, type **/ Move, F10,** ENTER, highlight the desired position and press ENTER again.

To select the target data base material to incorporate into the report requires selecting and sorting fields. Consult the R&R manual for detailed explanations on the Sort and Query features and follow the example below to access the sort capabilities.

Once the report format has been set up, the report needs to be sorted and grouped. These R&R features select, sort and categorize the information from the data base to be displayed in the report.

Select

/Sort-Group, Sort-Fields

The menu indicates that fields need to be specified. A menu appears on the right-hand side of the screen and the desired fields should be highlighted with the cursor. Once a field has been selected the menu automatically places the user at the second position. If another field is desired, repeat the above process until finished.

The Group-Fields capability is set up the same way. Select

/Sort-Group, Group-Fields

Once again, the menu states "specify fields." Press ENTER and a menu appears on the left-hand side of the screen. Select the fields as done in the "Sort-Fields" section above. When done select Quit and the main screen reappears.

Once the fields to be sorted have been selected, the queries need to be generated. The queries are the portion of the program that select the data from the data base according to the search specifications and place it in the report. In order to accomplish that, select

/Query, Edit

and there is a statement that looks like this

For example **(Org. is greater than or equal to 5000)** and **(Room_No is equal to "B*")**.

Cursor to the statement in parentheses and press ENTER. A menu appears in the lower left-hand corner of the screen. Make a selection. When initially generating the statement, a menu appears to give you the choices of using "and" "or." This means the data can be queried one way or several ways. If another query is desired, do the same for the next set of parentheses after selecting the "and" or "or" statement. Once the queries have been selected, select **Quit** and the main menu reappears.

These are the basics for editing, consult the manual for more details.

Before exiting the application, be sure to save the edited file by

/File, Save

Enter the report name if it wasn't done previously and press ENTER. To terminate R&R, type

/Exit

Producing a R&R Report

Enter R&R

At the main menu select the desired library by cursoring over to highlight or typing the first letter of the desired library. Press ENTER. On the next screen, select **Retrieve.** A smaller menu pops up on the left-hand side of screen with a list of reports that have been created in this library. Select the desired report by highlighting with the cursor, press ENTER. Once the report has been accessed, the following sequence from the main menu will print out a report:

/Print, Go

In the upper right corner is a red square flashing "Wait." In the center of the screen the following is also blinking

489 records read

All the printer default information is indicated on the right-hand side of the screen and the very bottom line indicates which page of the file is being printed.

Once the printing is complete, select **Quit** and the report reappears on the screen. To exit R&R, type

/Exit

and the program is terminated.

APPENDIX E

LIST OF SOFTWARE MANUFACTURERS

APPENDIX E

List of Software Manufacturers

dBase III Plus
Version 1.1
Ashton-Tate
20101 Hamilton Avenue
Torrance, CA 90502-1319

Harvard Total Project Manager II
Version 2.0
Software Publishing Corporation
P. O. Box 7210
1901 Landings Drive
Mountain View, CA 94039-7210

Hewlett Packard Scanning Gallery Plus
Version A.03.00
Personal Software Division
3410 Central Expressway
Santa Clara, CA 95951

Lotus Freelance Plus
Version 3.0
Lotus Development Corporation
55 Cambridge Parkway
Cambridge, MA 02142-9917

MASS11pc Word Processing
Version 7-A
Microsystems Engineering Corporation
2400 W. Hassell Road
Hoffman Estates, IL 60195

MASS11 Draw
Version 5.1
Microsystems Engineering Corporation
2400 W. Hassell Road
Suite 400
Hoffman Estates, IL 60195

R&R Relational Report Writer
Version 3
Concentric Data Systems, Inc.
18 Lyman Street
Westborough, MA 01581-4063